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United States Environmental Protection Agency

Smart Scoping of an EPA-Lead Remedial Investigation/Feasibility Study

1.0 INTRODUCTION

This fact sheet is a remedial project manager's (RPM's) guide to "smart" scoping the process for conducting remedial investigations and feasibility studies (RI/FSs). The integrated, three-step process facilitates well-supported and effective remedy selection decisions while improving project management by integrating project risk management concepts. Led by the RPM and supported by the core project team, the RI/FS smart scoping process is a structured approach that helps ensure EPA effectively identifies and addresses individual site priorities and employs investigative approaches appropriate to site conditions. The target audience for this fact sheet are RPMs for U.S. Environmental Protection Agency-lead (EPA-lead) sites.

Smart Scoping Goals

- Identify EPA priorities for the site
- Align investigation to the site strategy and CSM
- Support contracts acquisition planning
- Establish project planning and documentation throughout the RI/FS process

This fact sheet incorporates best practices in EPA's recent technical guides:

- *Smart Scoping for Environmental Investigations Technical Guide* (EPA 2018a) and
- *Strategic Sampling Approaches Technical Guide* (EPA 2018b).

It also supplements EPA's *Interim Final Guidance on Conducting Remedial Investigations and Feasibility Studies Under CERCLA,* Chapter Two (EPA 1988), and *Getting Ready: Scoping the RI/FS* (EPA 1989).

Although the focus is EPA-lead RI/FS projects, many of the document's principles and practices can be applied to other EPA-lead project phases (remedial design, remedial action, long-term response action). In addition, RPMs with potentially responsible party (PRP) or federal facility (FF)-lead RI/FS projects are encouraged to use smart scoping tools and the steps described in this document to support negotiation of enforcement documents, acquiring support contractors, and project planning and execution with their respective PRP or FF project teams.

2.0 RI/FS SMART SCOPING PROCESS OVERVIEW

The RI/FS smart scoping process entails three steps (Figure 1). The first two steps are part of RI/FS project planning and the third step relates to RI/FS team planning and execution. Table 1 provides a brief overview of the process.

Figure 1. Three Step RI/FS Smart Scoping Process

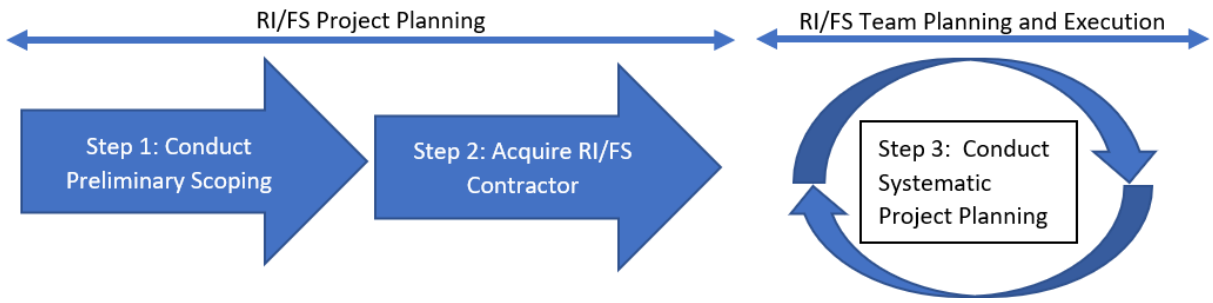

Table 1. Overview of RI/FS Smart Scoping Process

	Purpose	Activities	Outputs/Deliverables
Step 1: Conduct Preliminary Scoping	Establish high-level RI/FS project scope and schedule.	• RPM, in collaboration with their management, establishes core project team to help develop or update key planning documents (see outputs). • Based on outputs, core project team analyzes site priorities, conceptual site model (CSM) data gaps, and project risk and determines high-level project scope and schedule.	• Updated site planning documents (site strategy, CSM, project risk register) • High-level RI/FS project scope and schedule
Step 2: Acquire RI/FS Contractor	Develop RI/FS contract requirement and acquire RI/FS contractor.	• EPA conducts activities necessary to acquire RI/FS contractor. • EPA determines appropriate acquisition tool. • RPM, supported by core project team, uses outputs of Step 1: Preliminary Scoping to develop outputs of Step 2: Acquire RI/FS contractor; Step 1 outputs include technical procurement planning documents.	• Detailed contract requirement document • Independent government estimate (IGE) • Award of RI/FS acquisition vehicle

Step 3: Conduct Systematic Project Planning	Ensure sequence and scope of individual RI/FS tasks align with key project needs to advance RI/FS toward remedy decision.	• EPA core project team and RI/FS contractor:
		  ○ convene during key milestones in RI/FS schedule;
		  ○ update CSM and project risk register;
		  ○ review sequence and scope of upcoming RI/FS tasks to determine if modification needed and;
		  ○ develop decision logic to dynamically guide sampling in the field.
			• Updated CSM and project risk register
			• Agreed upon sequence and scope of future RI/FS tasks

The three steps of the smart scoping process are discussed in more detail below.

STEP 1: CONDUCT PRELIMINARY SCOPING

This section addresses key activities and outputs/deliverables developed or updated during preliminary scoping. These activities and deliverables are critical to the RI/FS project's planning and execution.

Preliminary Scoping Steps

- Establish the core project team
- Develop or update the CSM
- Conduct project risk analysis
- Define site strategy
- Document high-level RI/FS scope and schedule

Establish the Core Project Team

It is recommended that the RPM, in collaboration with their management, assemble a core project team to support the entire RI/FS smart scoping process. The team's membership and time commitment will vary as the process moves through the smart scoping steps.

The core project team may include staff or management with the expertise needed to address site-specific technical issues, RI/FS policy issues, and stakeholder concerns/challenges. Core team members may include geologists; hydrogeologists; human health and ecological risk assessors; engineers; sediments, radiation or mining site experts; community involvement coordinators; and budget and acquisition support staff.

Additional support may come from EPA regions, Headquarters, Office of Research and Development laboratories, states, tribes, other federal agencies, or support contractors.

Develop or Update the Conceptual Site Model

The CSM is an iterative, 'living representation' of a site (see Table 2 for CSM components). The CSM helps the core project team visualize and understand available information, and it is a primary project planning and management tool, updated and used throughout a project's life (EPA 2011). The CSM developed at the preliminary scoping stage outlines key site characteristics, data gaps, and assumptions.

The CSM format reflects a site's complexity and the amount of available site-specific information. Maps, figures, and tables can be used to effectively capture many of the CSM components. Table 3 shows an example CSM format and Table 4 provides an example of one element from one component of a site CSM from preliminary scoping.

The core project team's technical members assist in CSM development. The team uses the preliminary scoping CSM to identify data gaps, which, in turn, will inform site priorities and the high-level RI/FS scope's development. This CSM will be used and updated during Step 3: Conduct Systematic Project Planning.

Table 2. Components of a CSM

CSM Component	Description
Past Use and Disposal	Uses of site, known and suspected locations of sources, and contaminants of concern.
Previous Investigations	Conclusion and results from previous investigations conducted at site by EPA, state, or other entity.
Media and Transport	Media impacted by contamination and how contaminants are transported in media and between media. Potential media include sources of waste and contaminants; soil in unsaturated zone as a source or media for transport of vapors; groundwater, including soil and bedrock transporting groundwater; surface water; sediment; and air, including ambient air and indoor air affected by vapor intrusion.
Intended Reuse	Current and potential uses and local interest in reuse.
Decision Criteria	Criteria technical members of the core project team use to compare sampling results and make project-related decisions for each medium to be investigated.
Pathway Receptor Network	Primary and secondary sources, migration pathways, receptors, and exposure routes. Risk assessor on core project team takes lead on developing this component.
Technologies and Approaches	Characterization technologies and approaches and technologies and remedial actions that may be applicable to site conditions and that could be used to mitigate risks early in project and over the long term.
Completion Strategy	Strategy and schedule for operable units and pipeline phases of each operable unit; early actions; priorities; phasing of operable units and early actions; and completion of activities sitewide.

Table 3. Example Conceptual Site Model Format

Project Manager:			**Date:**
CSM Element	**Known Information**	**Data Gaps**	**Project Risks**
Past Use			Described in Table 5.
Previous Investigations			
Media and Transport			
Intended Reuse			
Decision Criteria			
Pathway-Receptor Network			
Technologies and Approaches			
Completion Strategy			

Table 4. CSM Example Excerpt from Site with Vapor Intrusion

Project Manager:		**Date:**	**Date:**
CSM Element	**Known Information**	**Data Gaps**	**Project Risks**
Previous Investigations	- Extensive RI: included soil, groundwater, vapor intrusion contamination delineation, and source identification	- Risk assessment not conducted - Some commercial sites not sampled - Utility conduits not evaluated as a potential migration pathway - Presence of dense non-aqueous phase liquid indicated but not confirmed - Other potential sources not evaluated	Excerpt in Table 6.

Conduct Project Risk Analysis

Project risk events are items that may affect a project's scope, schedule, budget, and contracting. Project managers continually evaluate such risks as the project progresses; project risks are separate and distinct from the human health or ecological risks assessed as part of the RI/FS process. Project risk events may represent technical or policy considerations, such as nature and extent of contamination, emerging contaminants, newly identified human health and ecological exposure pathways, and technology performance or effectiveness. Project risk events may also include project execution or management considerations, such as weather delays and seasonal work restrictions, site access, funding or contracting delays, and community or enforcement actions.

The core project team's technical and policy members help the RPM brainstorm and identify a site's project risk events. The core project team can analyze identified risks, namely the probability of occurrence and the potential impact on scope, schedule, or budget. This effort can help the core project team identify those project risk events that are high priority (i.e., have potential for greatest impact) and develop strategies to mitigate them.

During preliminary scoping, the project risk analysis has two purposes. It can: (1) help the core project team develop or refine the site strategy (discussed in the next section) to ensure site-level goals and priorities are informed and consider the project risk analysis' findings; and (2) assist in the high-level RI/FS scope's development and highlights key decision points in the implementation of site activities. These activities include the types of data collection activities or technology evaluations that might be considered during RI/FS execution.

The core project team may use a project risk register table (Table 5), a tool commonly used to present project risks in a concise, organized format. Table 6 provides an excerpt from the project risk register for the site in Table 4. The excerpt analyzes project risks related to the data gap of "other potential sources not evaluated."

Table 5. Example Project Risk Register

Project Risk Register for [Site Name]					
Remedial Project Manager:					Date:
Item No.	**Description of Project Risk Event**	**Probability of Occurrence (High/Medium/Low)**	**Consequence**		**Project Risk Mitigation Strategies**
			Description (Scope, Schedule, Budget)	**Magnitude of Impact (High/Medium/Low)**	
1					
2					
3					
4					

Table 6. Excerpt Example from Project Risk Register

Project Risk Register for [Site Name]					
Remedial Project Manager:					Date:
Item No.	**Description of Project Risk Event**	**Probability of Occurrence (High/ Medium/Low)**	**Consequence**		**Project Risk Mitigation Strategies**
			Description (Scope, Schedule, Budget)	**Magnitude of Impact (High/Medium/Low)**	
1	Additional undiscovered sources of VI contamination exist	High	• Record of Decision that does not address all VI sources • Delay in completing cleanup • Unacceptable human health risks	High	Include additional source identification in RI/FS scope

Develop the Site Strategy

A site strategy documents and prioritizes site cleanup goals, identifies key issues and challenges, and outlines a site-specific approach (strategy), including key CERCLA remedial activities, needed to achieve these goals. Informed by the CSM and project risk analysis, the site strategy serves as a framework for planning and scheduling the detailed activities necessary to achieve the project goals. Thus, the site strategy is the basis for the planning data entered into EPA's Superfund Enterprise Management System (SEMS). Like the CSM, the site strategy is a living document; the RPM and core project team review and update it throughout the site cleanup process to ensure it reflects current goals, issues, and priorities. It is recommended that RPMs revisit the site strategy at least annually.

The high-level RI/FS scope and schedule discussed in the next section should align with the site strategy.

Document High-Level RI/FS Scope and Schedule

Preliminary scoping's final step is to develop the RI/FS' overarching scope and schedule based on the site planning documents – preliminary CSM, project risk register, and site strategy. This high-level scoping and scheduling support the development of the next step's contract documentation. Table 7 lists the three main elements of a high-level RI/FS scope and schedule and provides examples for each element.

Table 7. Elements of High-Level RI/FS Scope and Schedule

Element	Examples
1. Part of site being addressed	- Operable Unit - Media
2. List of tasks to be conducted and planned timeframe	- Types of sampling anticipated - Modeling needs - Applicable or relevant and appropriate requirements to be identified and evaluated - Reuse assessment (EPA 2001) to determine and document reasonably anticipated future land use - Types of human health and ecological risk assessments needed - Types of technologies and alternatives to be evaluated - Any treatability studies envisioned - Community involvement needs - Any RI/FS support needed, such as technical meeting support and technical support during development of decision documents
3. Key milestones and schedule for achievement	- RI/FS acquisition completion - RI/FS completion - Decision document completion

STEP 2: ACQUIRE RI/FS CONTRACTOR

Using the preliminary scoping information, the RPM, with the core project team's support, initiates the acquisition of a contractor to perform the RI/FS. This initiation includes recommending the RI/FS acquisition vehicle, drafting the procurement package's technical documents, and as appropriate, participating in the RI/FS contractor selection process.

RI/FS Contractor Acquisition Steps

- Determine RI/FS acquisition vehicle
- Develop technical procurement planning documents
- Award RI/FS acquisition vehicle

Determine RI/FS Acquisition Vehicle

For an EPA-lead RI/FS, the Agency can use EPA pre-placed contracts, interagency agreements (IAs) with other federal agencies, or cooperative agreements (CAs) with states and tribes. Using the high level-RI/FS scope and schedule, the RPM works closely with the EPA contracting office to determine the most appropriate acquisition vehicle to deliver the RI/FS support services.

Develop Technical Procurement Planning Documents

Based on the selection of the acquisition vehicle, the RPM and the core project team use the preliminary scoping outcomes to develop the technical procurement planning documents, including a work statement, an IGE, and any technical evaluation factors necessary to acquire the RI/FS contractor.

Develop Work Statement

The work statement, commonly referred to as a "performance work statement" or "statement of work," defines RI/FS activities, deliverables, and timelines that the contractor will support. The core project team uses the CSM, project risk register, and high-level RI/FS scope to develop a work statement with the specificity necessary for the RI/FS contractor to provide a technical approach and estimated cost for the entire RI/FS effort. In the case of assisted acquisitions (i.e., IAs and CAs), the outputs of preliminary scoping

should be conveyed in the IA or CA requirement with sufficient detail to support the state or other federal agency's work statement development. The work statement includes priority data needs for the CSM and mitigation strategies to address any high priority project risks. The format of the work statement depends on the selected acquisition vehicle.

Develop Independent Government Estimate

The IGE includes detailed cost estimates for all RI/FS tasks in the work statement. For EPA contracts, the estimates comprise the labor, equipment, travel, subcontracting, and other direct costs for the task's completion. The project risk register, which helps identify those items or tasks that have a high change probability, can help the core project team determine the contracting structure and pricing methods that best accommodate these project risks.

Technical Evaluation Factors or Criteria

If an EPA contract is being used to acquire the RI/FS contractor, the RPM, with support from the core project team, identifies what technical qualifications and capabilities are critical for the RI/FS contractor to possess to ensure successful execution of the work. Those qualifications and capabilities are communicated and coordinated with the EPA acquisition office to support the procurement package's development and any evaluation procedures needed.

Award RI/FS Acquisition Vehicle

Based on the selected acquisition vehicle, EPA will acquire the RI/FS contractor in accordance with the Federal Acquisition Regulation and EPA acquisition guidance.

STEP 3. CONDUCT SYSTEMATIC PROJECT PLANNING

At this point, RI/FS acquisition activities have been completed, and the RI/FS contractor becomes part of the core project team.

RI/FS projects are typically multi-year projects where tasks are sequenced and scoped based on the best available information and the baseline CSM. Since there are considerable data gaps in the CSM during an RI/FS, there is high probability that either the sequence or scope of RI/FS tasks may change as the project progresses.

Systematic Project Planning: Timing

- At kick-off meeting after RI/FS contract award
- Before each RI/FS data collection effort

Goal of Collaborative Systematic Project Planning Meetings

Develop a consensus (or divergence) on known site conditions, contaminant fate and transport hypotheses, data gaps, data collection plans, and potential remedial challenges.

Systematic project planning is a process that requires the core project team to convene during key milestones in the RI/FS schedule in order to update the CSM and project risk register, and to review the sequence and scope of upcoming RI/FS tasks to determine if they are still appropriate or need modification. Systematic planning ensures that budget and resources are focused on those items critical to advancing the RI/FS project towards remedy decision. EPA promotes the use of systematic planning after RI/FS contract award for EPA-lead projects and, at a minimum, before each RI/FS data collection effort. More information on systematic planning is found in *Guidance on Systematic Planning Using the Data Quality Objectives Process* (EPA 2006).

The systematic project planning activities described below focus on: (1) Systematic planning during kickoff meeting, and (2) Systematic planning meetings during RI/FS execution. The RPM, supported by the core technical team and the RI/FS contractor, leads systematic project planning.

Kickoff Meeting

After EPA awards the RI/FS acquisition vehicle, the EPA project team and the RI/FS contractor, jointly referred to below as the RI/FS team, generally hold a kickoff meeting to discuss the project. EPA should include systematic project planning as an agenda item. At the kickoff meeting, systematic planning efforts focus on striving for understanding and consensus around the project scope and schedule and the related key project management and contracting documents. Below are some systematic planning agenda items to consider for the kickoff meeting:

- *Review preliminary CSM*. The RI/FS team discusses the preliminary CSM developed during preliminary scoping. This discussion ensures the RI/FS team becomes familiar with the CSM's content and that the team strives to reach consensus on data gaps and how the RI/FS scope and sequence of activities address those gaps.
- *Review project risk register*. The RI/FS team reviews the project risk register's contents and adds or modifies project risk events, based on RI/FS contractor input.
- *Review rationale for RI/FS tasks' sequence and scope*. Typically, when EPA executes an RI/FS, the work statement has a sequence of RI/FS tasks. The RI/FS team discusses the rationale for the sequence of tasks, with a focus on near-term (funded) tasks, their objectives, and how the information will be used to inform scope and sequence of the next set of tasks.
- *Establish milestones for subsequent systematic project planning meetings*. As is discussed in the next section, systematic planning meetings are important throughout RI/FS execution, particularly when planning for and after execution of an investigation or data collection event.

Meetings During RI/FS Execution

The purpose of systematic project planning meetings is to ensure adequate planning is conducted throughout the RI/FS. These meetings are an essential part of the process the RI/FS team uses to collaboratively review and update key project management documents and make needed changes to the RI/FS scope and sequence of activities. This process ensures that, throughout RI/FS execution, time and resources are allocated to activities that effectively advance the RI/FS process towards remedy selection.

Prepare for and Conduct Systematic Project Planning meetings

Systematic project planning meetings occur at key milestones throughout the RI/FS process, prepare for a field investigation or data collection event, or after these events. To prepare for each systematic planning meeting, the RI/FS team refines the current CSM based on information collected from ongoing RI/FS activities or any new site information that has come to the RI/FS team's attention.

At each systematic project planning meeting, the RI/FS team discusses and further refines key project management documents based on the team discussions and consensus. Discussions include:

Systematic Project Planning Aligns CSM and Project Risk Updates with RI/FS Tasks

As part of systematic project planning, the RI/FS team reviews the scope and sequence of upcoming RI/FS tasks in contracting documents. The review focuses on whether the task scope adequately addresses key CSM needs and project risk events or if modification is needed.

- *Review and update current CSM*. The RI/FS team reviews and discusses the current CSM. The team focuses on data gaps, evaluates sequencing dynamic work strategy tasks, and identifies any potential remedial challenges. The team should strive for consensus on the types of data collection or information gathering needed to address these gaps and challenges.
- *Review and update project risk register*. After review of the CSM, the RI/FS team reviews the project risk register, which may result in changes to existing project risk events, particularly in terms of probability or consequence, and changes to mitigation strategies. The project risk analysis may also identify new risks based on ongoing RI/FS activities.

Meeting Outcomes

If contracting documents require changes, the EPA RPM summarizes the change and discusses with the contracting agency (i.e., EPA contracting office, other federal agency, or state). As appropriate, the EPA team assists in preparing documentation to support the appropriate contract modification action.

When the RI/FS team agrees on the upcoming tasks' scope, EPA may request that the RI/FS contractor prepare a detailed workplan for this activity. It is recommended that these workplans focus on a dynamic work strategy describing the tools and techniques for the site investigation and event sequencing to be used to fill data gaps. The dynamic work strategy's purpose is to collect data, make decisions, and adjust investigative activities in real time. Important components of a dynamic work strategy include a flexible sampling approach, an adaptive quality control program and clearly documented decision logic (EPA 2005). The RI/FS contractor integrates the dynamic work strategy into project plans such as the health and safety plan, sampling and analysis plan, quality assurance project plan, and data management plan.

3.0 CONCLUSION

Smart scoping supports the development of a robust CSM needed for effective response action development, selection and implementation (EPA 2018a). Smart scoping, including systematic project planning, integrates the CSM and project risk management with the overall site strategy, which, in turn, supports the development of the RI/FS, including its scope, schedule, and budget needs.

4.0 REFERENCES

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